Bartels AutoEngineer®
Version 8.0
Release Notes

This documentation contains information about the new features introduced with **Bartels AutoEngineer Version 8.0**. Forward compatibility from earlier versions to **Bartels AutoEngineer Version 8.0** is ensured, but not backward compatibility.

Bartels AutoEngineer Version 8.0 Release Notes
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Contents

1   General

1.1   Installation

Installation Guide

The Bartels AutoEngineer® Installation Guide (file `inst_en.htm` from the `baedoc` directory of the BAE-CD-ROM) provides detailed **Bartels AutoEngineer** installation instructions for all supported hardware and software platforms.

Windows 8.1 and Windows 8

The **Bartels AutoEngineer** software can be operated on **Microsoft Windows 8.1** and **Windows 8** operating systems.

Hardlock Drivers (Linux)

The `hardlock` directory in the `baelinux` directory of the BAE CD-ROM contains a number of sub-directories with updated hardlock drivers for some commonly used **Linux** distributions. These drivers are intended for later **Linux** versions which don't support the previously required usbfs file system without new kernel compilation.

Configuration Files

The `ALTCONFPATH_STD` parameter for specifying an additional configuration file directory has been added to `bae.ini`. The boxes for selecting color tables, aperture tables, macros and batches have been modified to display an additional selection column with elements from alternative configuration files if an `ALTCONFPATH_STD` directory is configured. Alternative configuration file elements are read-only elements. The system can only save to standard configuration files. Batches from alternative configuration files can be started by double-clicking the batch name in the corresponding selection box.

The alternative configuration path is intended for network installations. It enables the system administrator to provide standard color tables, macros, etc., yet allow for user-specific overrides of such settings.

The `ALTCONFPRIO_STD` parameter for setting a configuration file type priority has been added to `bae.ini` for (legacy) element name specifications without config file name references in call sequence extensions for macros, shortcut keys, menu extensions and batch definitions. On default, the system picks the alternative configuration file. To force alternative or standard configuration file extensions, element names in call sequence extensions can be prefixed with either `!` or `?`, respectively.

1.2 User Interface and General Functions

Settings bae.ini

The Edit bae.ini and Edit baeuser.ini buttons for loading these files from the location specific to the operating system and/or the current user to the application assigned to the `.txt` file name extension has been added to the dialog of the Settings / Settings bae.ini function.

The functions for loading additional configuration files such as `baeuser.ini` and `baebase.ini` have been modified to shorten redefined array variables to the last loaded array entry to prevent remnants from previously loaded longer arrays are reloaded.

Distance Measuring

The distance query function which can be activated through the d key has been modified to display grid ticks on the distance line in 10mm, 1mm or 0.1mm steps depending on the current display zoom factor. This simplifies the estimation and/or retrieval of intermediate distances during interactive distance queries.

Coordinate Input

The Set Reference Point button for setting a new reference/start point for relative jumps has been added to the coordinate input dialog of the Jump Relative context function. Together with the p key for snapping gridless placement positions of other elements, this enables a range of new constructive features.

Pick Aperture

The `PICKAPERTURE_STD` parameter for setting the pick tolerance range for screen elements to a value different from the 3.0 mm default value has been added to `bae.ini`. Please note that large pick tolerance values might lead to situations where context menu calls for empty areas become inaccessible.

Context Menu (Windows)

It was not possible to activate the right mouse button context menu in BAE **Windows** versions if the BAE window extended over the left edge of the screen and/or was displayed on the left-hand monitor in multi-monitor configurations. This problem has been fixed.

Message Boxes (Windows)

Message and confirmation popup windows are now positioned with the default button under the mouse cursor rather than with the dialog window center under the mouse cursor. If the mouse cursor is within the area of the previously openend popup window, then the new popup window is positioned at the position of the previously opened popup window. This ensures that the mouse pointer is automatically positioned on the previously selected dialog button when repeatedly activating the same message or confirmation popup window.

File Selection Boxes (Windows)

The default setting of the `FSELMODE_STD` `bae.ini` parameter configured file selection dialog boxes with initial dialog size changes according to the **Explorer** style of older **Windows** versions. However, in recent **Windows** versions, the file selection dialog resize option is prone to create malformed and difficult to use dialog boxes. To counteract the fact that existing `bae.ini` settings are not changed during BAE update installation and would therefore exaberate this problem, the system has been modified to ignore the `FSELMODE_STD` parameter setting and use the **Windows** default file selection dialog boxes instead. The `FILESELMODE_STD` parameter has been introduced to re-activated the old auto-resize dialog behaviour.

Library Macro Selection

A memory for the library macro listing in the center column of the three-column library element selection box has been implemented. This saves delays when repeatedly placing macros from network library files. The Update button can be clicked to refresh the macro list.

Popup Menus (Windows)

Activating popup menus at the bottom and/or right-hand side of the screen in the BAE **Windows** versions generated unwanted display artifacts and triggered unnecessary screen redraw operations. This problem has been fixed.

Rule Assignment

The Rules , String Predicates , Double Predicates and Integer Predicates functions for setting rules and rule system predicates have been added to the right mouse button context menus. Activating the context menus in an empty area or outside the element boundaries allows for the rules and predicates of the currently loaded element to be set.

The rule selection list boxes have been modified to list only those rules which are assigned to the group-selected elements rather than all rules from the rule database. This simplifies the rule selection and enables the selection of synthetically generated predicate rules.

Favorite Dialog Boxes

The Add to function history option for configuring functions for repeat function calls through the left mouse button and inclusion in the right mouse button command history of the H toolbar button has been added to the function property dialogs of the Utilities / Favorite Dialog Boxes function.

The BAE **Windows** version has been modified to allow for the specification of tooltips for function buttons.

The BAE **Windows** version has been modified to support the use of external bitmap files for dialog box and button and label backgrounds.

The Tiny Caption parameter for displaying favorite dialog boxes with a minimized title bar has been added for the **Windows** versions.

Motif Libraries (Linux)

To eliminate potential BAE installation problems on newer **Linux** distributions, the BAE **Linux** versions have been linked to the **Motif** library of `libmotif4` instead of the now rarely used and difficult to source `openmotif21`.

Dialog size modifications failed in some new **Linux**/**Motif** versions where minor mouse movements triggered immediate dialog redraws and a drop of the resize pick. A resize time delay has been implemented to overcome this problem. A continuous mouse movement is now required during dialog resize operations.

Window Activation

The BAE **Windows** versions have been modified to automatically switch the focus between non-overlapping BAE windows and to bring the focussed BAE to the foreground if the mouse pointer is dragged from one BAE window to another. The `AUTORAISE_STD` parameter for deactivating this feature has been added to `bae.ini`.

Dialog Box Positions

The `DIALPOSMODE_STD` parameter for controlling the dialog position memory has been added to `bae.ini` and to the Settings / Settings bae.ini menu. The Desktop absolute default setting saves the fixed full desktop dialog box position. The Relative to BAE Window setting saves the position relative to the next edge of the BAE window. The Absolute at Monitor of BAE Window setting saves the position on the monitor on which the BAE window is displayed. The latter two options are useful for multi-monitor configurations since they ensure that the dialog window can be moved with the BAE main window between different monitors.

The Relative to BAE Window mode moves assistant dialog boxes attached to the BAE main window, thus keeping such dialog windows attached to the BAE main window.

The File / Library Utilities / Delete Elements / Window Positions function for removing position entries for BAE and dialog windows has been added to allow for dialog box positions to be reset.

Modal Dialog Boxes

The user interface of the BAE **Windows** versions has been modified to automatically switch the input focus between permanently open modal BAE dialog boxes and the BAE main window when moving the mouse. This saves extra mouse-clicks for focussing the BAE main window which were otherwise necessary prior to the activation of right mouse-click context menus after modifying settings in assistant dialog boxes.

Certain modal dialog functions of the BAE **Motif** versions caused the system to freeze. This problem has been fixed.

File Name Selection

The BAE dialogs for selecting files with specific element types (e.g., in Load with check) have been modified to display files from the current project file directory on default rather than files from the current working directory. This simplifies such file selections under **Windows 7** where the current working directory is not necessarily the project file directory.

Element Preview

The `PREVIEWRANGE_STD` parameter for setting the relative width of the element preview in the element selection dialogs to a value different from the 25% default value has been added to the `bae.ini` file. This feature can be used to improve the display of landscape format elements, albeit at the cost of potentially reducing the number of simultaneously displayed list elements.

Library Macro Selection

The three-column library macro selection dialog has been modified to keep any non-default library selection in the right column for subsequent center column macro selections. This simplifies the placement of multiple symbols from specific non-default libraries. The Default Library button has been added for switching back to the default Settings / Settings library.

Library Cross Reference

A directory selection has been implemented in the File / Library Utilities / Library Cross Reference function. Thus it is not necessary anymore to start BAE in the working directory for the Library Cross Reference function.

An option for listing logical library definitions has been added to the Library Cross Reference function.

Dialog Box Edit Fields (Motif)

The **Motif** dialog boxes with multiple edit fields have been modified to mark the complete edit field content when focussing on an edit field with, e.g., the Tab key. This allows for the edit field content to be replaced by simply starting to type.

Data Import

Some BAE import function ran into endless loops if the input files contained specific syntax errors. The import functions have been modified to handle such errors by way of issuing appropriate syntax error messages.

Polygon Error Handling

The warning messages issued when skipping invalid polygons when loading elements which were created with old BAE versions have been extended to display not only the polygon layer but also the polygon start coordinates and macro names and types for macro polygons. This makes it easier to locate the errors.

Text Fonts

The functions for loading new character fonts have been modified to set the status of the currently loaded element to unsaved rather than saving that element without confirmation.

File Type Bindings (Windows)

Extended **Windows** registry entries are queried to improve associated application matching for special files such as DXF and PDF files.

1.3   Symbol and Part Libraries

New Library Elements

The following elements have been added to the symbol and part libraries supplied with the BAE software:

Library	Type	Elements
ROUTE	Symbol	att_minnetlen
ROUTE	Symbol	att_netlenrange
ROUTE	Symbol	tag_symarea_infotext
ROUTE	Symbol	tag_net_minnetlen
ROUTE	Symbol	tag_net_netlenrange
ROUTE	Symbol	tag_netarea_minnetlen
ROUTE	Symbol	tag_netarea_netlenrange
ROUTE	Symbol	tag_netpin_minnetlen
ROUTE	Symbol	tag_netpin_netlenrange

Attribute Symbols

The `terminal` pin macros have been replaced with `labelpin` pin macros on symbol macros with the `att_` name prefix in the `route.ddb` SCM symbol library. The `labelpin` pin macro triggers the system to generate a new connection at the pin position when first placing the symbol at positions without connection.

Default `??` attribute values have been assigned to the symbol attribute values of the `route.ddb` library to activate the Assign Value(s) dialog for assigning attribute values when placement these symbols.

2   Schematic Editor

2.1   General

Settings (Windows)

Tab controls and a number of parameter settings which were previously only implemented through different menus and submenus have been added to the Settings / Settings dialog of the BAE **Windows** versions.

Autosave

The `AUTOSAVEP_SCM` parameter for specifying an alternative directory for saving `.bak` files through the **Schematic Editor** autosave feature has been added to `bae.ini`.

Item Browser

The Utilities / Item Browser function has been implemented for activating a modal dialog with controls for fading in or fading out element types from the different hierarchy levels. The dialog includes controls for selecting area polygon types, thus providing features for controlling the display of, e.g., specific net areas.

The element fade-outs of the Item Browser are considered by DXF and EPS/PDF outputs without batch definitions.

Context Functions

The right mouse click context menu functions for texts and areas have been modified to display information about the pick element in the status line. This helps to identify the pick element in densely populated areas.

Variant Visibilities

The rules `var_docvis00only`, `var_docvis01`, `var_docvis02` etc. have been extended to allow for the variant-specific visibility of texts and graphics to be controlled not only in PCB layouts but also on schematic plans. In project files from older BAE versions which are already using these rules in the layout, a Settings / Rule Attachment / Rule Update function call is required to activate these rules in the schematics.

Element Comments

The Colors option for assigning element comments to color tables in the `scm.dat` file has been added to the File / Library Utilities / Element Comments submenu. These element comments are then dislayed with color table selections.

Update Library

A fixed header line which displays the number of copied elements and the number of missing source file elements has been added to the final report of the Update Library function.

SVG Format

The SVG Output function for generating SVG (Scalable Vector Graphics) outputs from the currently loaded schematic element has been added to the File / Import/Export submenu. Scalable Vector Graphics (SVG) is an XML-based vector image format for two-dimensional graphics that has support for full scalability and can be edited with text editors or suitable drawing programs. The SVG specification is an open standard developed by the World Wide Web Consortium (W3C) since 1999. All major modern web browsers have at least some degree of support for SVG and can render the markup directly.

2.2   Symbols, Labels

Symbol Data Query

The p key property dialog box has been modified to display the symbol name pattern for the used symbol macro in the symbol attribute/pin list subwindow. This allows for symbol names deviating from symbol name patterns to be immediately identified.

The `PTABCTRL_SCM` parameter for configuring separate tab controls for the display of symbol attributes and symbol pins in the BAE **Windows** versions has been added to `bae.ini`.

Symbol Rotation

The Pin Rectangle 180 Degrees button for rotating the selected symbol around the center of the surrounding rectangle of the symbol pins has been added to the p key symbol properties dialog.

The Reroute Connections option for activating and/or deactivating automatic signal re-routing for symbol/label move and rotate functions has been added to the p key symbol/label properties dialog.

Attribute Assignment

The `attrset:'?last'` command for automatically providing the attribute set of the previously placed symbol without symbol selection requirement has been added to the call sequence of the Assign Value(s) function for macros, key programming, etc. The `attrset:'?last'` command supports an attribute name suffix as `attrset:'?last':'$plname'` for automatically setting the input focus of the attribute assignment dialog to the selected attribute. This allows for the programming of symbol placement macros with subsequent attribute assignment.

Attributes can be enclosed with questionmarks when defined on symbol macro level with the Attribute Default Values function. When the symbol is placed in the schematic plan, these questionmarks will be removed and the attribute assignment dialog is automatically activated with focus on the attribute. This allows for important symbol attributes to be preset and automatically controlled and/or changed upon symbol placement.

The `ATTR_BASEVAR_STD` parameter for defining a list of attributes which can only be set in the base variant has been added to `bae.ini`.

The symbol move functions replicated attributes under specific circumstances. This could cause problems in attribute processing functions. Such attribute replications are now avoided, and replicated attribute assignments in existing projects are automatically eliminated by the **Packager**.

Under **Windows 7**, double-clicking the `!not_set!` text selected either the first exlamation mark or the text remainder depending on the mouse position. The **Windows 7** user interface of the **Schematic Editor** has been modified to restore the **Windows XP** double-click behaviour for full text selection.

Header Symbol Attributes

The Set Frame Attributes function has been modified to load and set all header symbol variant attributes regardless of the currently active variant selection. In cases where a project contains multiple variants, the current variant name is displayed in the first line of the value assignment dialog, and the < and > buttons can be used to step through the variants. Complete variant attribute settings are useful when inserting new schematic sheets into projects, as this eliminates the need for individually setting the header attributes for each and every variant.

Symbol Attribute Cleanup

The Symbols / Other Functions / Set Attributes / Attribute Cleanup has been modified to reset $ symbol attributes if the project file does not contain a layout net list. This feature ensures that, after copying schematic sheets from different project files into a new project file, the copied symbols are displayed with their logical part names rather than any obsolete $ layout part names.

The Attribute Cleanup function did not consider attribute texts which are hidden through visibility class assignments. This problem has been fixed.

Symbol Renaming

The Symbols / Other Functions / Renumber Parts submenu functions have been modified to preserve the group selection status of renamed parts.

The 1st Digit pattern position option has been added to the Replace Pattern symbol rename function. This allows for the renumbering of symbols with different length name prefices such as, e.g., `r100` and `ic100` to `r200` and `ic200`.

SCM Cross Reference

A layout package name column has been added to the symbol/part output of the Symbols / Other Functions / SCM Cross Reference function.

The bus tap count column of the SCM Cross Reference output did not contain any data. This problem has been fixed.

Some column headers of the SCM Cross Reference output have been shortened to create a more compact and more legible cross reference listing.

Load Macro (BAE HighEnd)

The Load Macro New Window for loading the macro in a new **Schematic Editor** window has been added to the context menus for symbols, labels, bustaps and pins. The Load Macro New Window is useful when controlling symbol macros in large schematic sheets as it eliminates potentially time-consuming schematic sheet reload operations. Please note that, if the loaded macro is modified, the elements referring the macro must be reloaded to reflect the macro changes.

Standard Macros

Default buttons for easily selecting the standard macros of the default library have been added to the junction point, standard label, bus tap label, port label and pin symbol macro name input fields of the Settings / Settings dialog in the **Schematic Editor**.

Pin Numbering

The function for saving schematic symbols has been modified to issue a warning if the symbol contains pin names with numeric parts at the end and pins are not consecutively numbered.

Symbol Generation

The functions from the Symbols / Other Functions / Create FPGA Symbol submenu only listed the first pin for `net internal` command configurations with double signal names. This problem has been fixed.

Logical Definitions

The Save As has been modified to provide an option for creating a logical part definition when saving a schematic symbol. The logical library definition is copied from the source project/library file and stored with new logical `part` name to the destination project or standard library file.

On symbol macro level, the Show Symbol Logic function sometimes displayed `Library` as source for the logical library definition, even for logical definitions originating from the project file. The Show Symbol Logic function has been modified to display the logical library definition source file name.

Symbol Database

A project data Update from the symbol database issued redundant symbol macro change warnings for parts with multiple symbols. These warnings are now suppressed.

Symbol Documentation

Settings such as `SSELPDF2_SCM`/`SSELWWW2_SCM`, `SSELPDF3_SCM`/`SSELWWW3_SCM`, etc. for specifying columns for the symbol database are now supported in the `bae.ini` file in addition to the `SSELPDF_SCM`/`SSELWWW_SCM` settings. A selection of table fields with documentation assignments is displayed if a documentation query for a symbol matches mutliple documentation files. The `bae.ini` entries contain the PDF keyword only for historical reasons. The corresponding database fields have been modified to support any file type. The standard web browser is activated if no default application is assigned to the selected file type.

The `DOCATTR_STD` parameter for specifying a symbol attribute for referencing a documentation file independently from the symbol database has been added to `bae.ini`. Since this attribute supports different variants, it can be used on plan header symbols to refer variant-specific documentation. If the plan header macro contains context functions, then the call sequence for the Documentation context function is `symsel:"docu":ml`. Once the documentation attribute is transferred to the layout it can also be queried through the corresponding layout part.

The Doc button for calling the symbol document file has been added in the p dialog for symbols with assigned documentation files.

Net Highlight

The View / Highlight Net has been changed to support the picking of label texts and graphics for net highlight. This simplifies net selections for short net segments between pins and connected labels. Consequently, the View / Highlight Net function has been added to the label context menus.

The net highlighting/coloring features have been modified to highlight/colorize connected labels. This simplifies the identification of nets when the highlight focus is set or when carrying out PDF outputs with nets coloring.

2.3   Connections

Junction Markers

Junction point markers are now included in group highlights if at least one adjacent connection segment is group-selected.

The Add Conection function has been modified to try the default connection point marker setting `DEFJCTMAC_SCM` from `bae.ini` or the `junction` setting if no connection point marker is defined in the current project; the Add Conection function only aborts with a missing junction point marker message if these default settings fail.

2.4   Graphics

Move Corners

The Move Corner menu item in the Graphic menu has been renamed to Move Corner(s).

The Move Corner context function for moving single polygon points has been modified to automatically insert additional 45 degree segments at both neighbouring segments if the Octagonal option is active.

Polygon Pick

The Move Graphic and Copy Graphic functions have been modified to allow for polygons to be picked not only at corners but also at segments. This ensures that the Move Graphic and Copy Graphic functions in the right mouse button context menus for polygons can process the context polygon even it has been picked at a segment rather than a corner point. The reference point for the move operations is still the polygon corner point closest to the pick point.

With the Warp to Element Pick Position option activated through Settings / Settings bae.ini, the graphic cursor jumps to the closest area corner point when selecting areas.

Arc Radius

The arc radius control for arc center points in the p key element property dialog has been modified to allow for changing the arc radius rather than only displaying it. Arc start and end points are automatically re-positioned according to modified radius settings.

Arrow Drawing

The Line and Polyline functions for adding an arrow tip to the end of graphic line segments and line polygons have been added to the Areas / Other Functions / Drawing Utilities / Draw Arrows submenu.

DXF Import

The AutoCAD/DXF Input function only partially imported filled areas with arcs in the outline. This problem has been fixed.

The Polygon Mode parameter for controlling whether circles and/or ellipsis should be imported as lines or areas has been renamed to Circles/Ellipses, and the Closed Lines mode for importing closed line polygons as areas has been added.

2.5   Text, Attributes

Text Alignment

The Align right option has been added to the text placement functions.

Text Search

The View / Find Symbol / Search Text has been modified to search for texts on all rather than the currently loaded element hierarchy level. This allows for symbol macro texts and attribute value settings to be found on SCM plan level. The symbol/label and/or the attribute name of the matched text is included in the status line message. The currently matched text index and the total number of matches is also displayed in the status line if the search returns multiple texts

The Search Text function has been extended to support text pattern searches.

Clipboard (Windows)

The Ctrl-V key function for assigning clipboard attribute values has been modified to support **!not_set!** attribute value settings for clearing attribute value assignments.

The Copy Values button for copying symbol attribute values as texts to the clipboard has been added to the p key property dialog. This simplifies the attribute transfer between different **Schematic Editor** windows.

2.6   Group Functions

Group Rotation

The functions for moving and copying groups have been modified to allow for arbitrary rotation angles if no connections or connected pins are inlcuded in the group.

The functions for rerouting connections for group movement operations have been modified to consider mirror modes and/or rotations for selected group elements when calculating the vectors to extisting connection destination points. This ensures that connections to non-group elements are preserved when moving mirrored and/or rotated groups and/or group elements.

Named Group Movement

The `Move Group xxx` function has been added to the right mouse button context menu for named groups. `Move Group xxx` resets the current group, selects all elements with a group name assignment equal to the group name of the selected element, performs a `Move Group` operation and resets the group selection again. This simplifies the movement of named function blocks as it eliminates the need for explicitly selecting the function block elements prior to the move operation.

Glued Elements

The `Move Group` function has been modified to provide options for deselecting or moving glued group elements or cancel the function if glued elements are in the group.

Group Report

The `Edit` / `Other Functions` / `Group Report` function has been modified to include group-selected dotted lines not only in the total number of group-selected items, but also in the polygon type listings.

2.7   Plot Output

EPS/PDF Output

The `Group only` option for restricting the output/export to group-selected elements has been added to the `EPS/PDF Output` function. The `Clipping On` option can be used to adapt the output sheet size to the group area.

The clipping and group options have also been added to the EPS/PDF batch output dialogs.

The EPS/PDF batch output file definitions have been modified to allow for the specification of an output file name prefix to be inserted before the project name and/or attribute values.

The output element definitions for EPS/PDF batches have been extended to allow for the selection of net areas through a polygon type specification. When loading/starting batches which were created with older BAE versions, the settings for grafic areas on plan level are transferred to net areas.

Multi-line texts on symbols macros saved with `Save as` were sometimes exchanged in plan level EPS/PDF outputs. This problem has been fixed.

DXF Export

The DXF export function did not export tag links for tags. This problem has been fixed. The DXF outputs have been extended by dotted tag pin to tag destination connection lines.

2.9   Backannotation

Netlist Selection

To reduce the number of backannotation confirmation prompts, the automatic backannotation request check in the function for loading schematic plans has been modified to include the net list name for single backannotation requests with the backannotation confirmation prompt.

3   Packager

3.1   Name Assignments

Name Changes

When changing layout part name preferences in `$rpname` attributes, previously set part names remained in the net list with empty package assignments until a second **Packager** run was carried out. This problem has been fixed.

3.2   Attribute Assignments

Tag Attribute Transfer

Synthetically generated internal tag names of part range tags were transferred to the `$orgname` and `$sym` attributes of the symbols in the part area. This generated irritating attribute values and attribute mismatch packager warnings for multi-symbol parts. This problem has been fixed. The `$orgname` and `$sym` attributes are not modified by tag symbols anymore.

Attribute Cleanup

To prevent name conflicts caused by `$spname` settings in duplicated and/or copied circuitry, the **Packager** has been modified to reset any `$spname` settings from net list import and symbol rename processes for assigning symbol names for the first **Packager** run.

4   Layout Editor

4.1   General

Settings (Windows)

Tab controls and a number of parameter settings which were previously only implemented through different menus and submenus have been added to the Settings / Settings dialog of the BAE **Windows** versions.

Autosave

The `AUTOSAVEP_GED` parameter for specifying an alternative directory for saving `.bak` files through the **Layout Editor** autosave feature has been added to `bae.ini`.

Context Functions

The right mouse click context menu functions for traces and areas have been modified to display information about the pick element in the status line. This helps to identify the pick element in densely populated areas.

FabView

The **FabView** module has been modified to trigger a warning message upon the first layout modification to caution the user that she/he is about to carry out irreversible layout changes with the **FabView** module.

EPS/PDF Output

The Group only option for restricting the output/export to group-selected elements has been added to the EPS/PDF Output function. The Clipping On option can be used to adapt the output sheet size to the group area.

The clipping and group options have also been added to the EPS/PDF batch output dialogs.

The EPS/PDF batch output file definitions have been modified to allow for the specification of an output file name prefix to be inserted before the project name and/or attribute values.

The Text mirroring and Text always LOGICAL options for overriding the standard mirror and text mode visibility settings for layer-specific texts have been added to the output layer setups for PDF batches, thus providing new options for mixed outputs of layers with `LOGICAL` and `PHYSICAL` texts.

The `PSNEGTEXT_LAY` parameter for deactivating the **Schematic Editor** negation text character processing and printing texts exactly as displayed on screen has been added to `bae.ini`.

The PDF batch definitions have been extended to allow for the specification of page-specific page size markers with names different from the default marker reference names `pdf_lx` and `pdf_uy`. This allows for the setup of specific "output windows" for different output batches.

SVG Format

The SVG Output function for generating SVG (Scalable Vector Graphics) outputs from the currently loaded layout element has been added to the File / Import/Export submenu. Scalable Vector Graphics (SVG) is an XML-based vector image format for two-dimensional graphics that has support for full scalability and can be edited with text editors or suitable drawing programs. The SVG specification is an open standard developed by the World Wide Web Consortium (W3C) since 1999. All major modern web browsers have at least some degree of support for SVG and can render the markup directly.

Netlist Import

The netlist import function issued erroneous pin reference error messages for part macros with missing pins. This problem has been fixed.

The name of the first missing pin together with the part macro name is now included in the missing pin processing mode prompt. Thus, the user can recognize part/pin name patterns before deciding to ignore missing pins.

The net list import function has been extended to support net lists in NDF format. NDF net lists are identified through the keyword NDF in the input file header.

Element Comments

The Colors and Aperture Tables option for assigning element comments to color tables and aperture tables in the `ged.dat` and `cam.dat` files have been added to the File / Library Utilities / Element Comments submenu. These element comments are then dislayed with color and aperture table selections, respectively.

Update Library

A fixed header line which displays the number of copied elements and the number of missing source file elements has been added to the final report of the Update Library function.

Eagle Interface

The `lbaedmp.ulp` ULP program for exporting **Eagle** layout data in BAE ASCII format stopped with an error message if the project/library contains an SMD macro with bottom layer pads. This problem has been fixed.

4.2   Display, Design Rule Check

Corner Scan

The corner scan will be deactivated if an already activated View / Other Functions / Corner Scan submenu option is selected. This is useful for toggle key assignments.

Trace Edit Display

The options from the Traces 1 Other Functions 1 Edit Display submenu have been made available in the View / Settings dialog.

Polygon Display

The Polygon Move Display parameter has been added to the View / Settings dialog. The Filled Display rather than the Outline Display area display mode during polygon, part and via move operations is set as default, thus allowing for pads to be more easily distinguished from surrounding distance lines when, e.g., moving parts with DRC Distance Display activated.

Element Query

The View / Query Element element has been made available on padstack and pad level.

Holding down the Ctrl key on padstack level causes the system to include drill holes in the short info display and to display the drill hole diameter at the mouse cursor.

Color Tables

The right mouse-click behaviour of the layer color buttons in the colour settings dialog and the toolbar has been modified to switch the layer color to white instead of the somewhat useless faded-out black setting. This makes it easier to partially display layers without color assignment.

New `TB_DLCOLN1_LAY`, `TB_DLCOLN2_LAY`, etc. parameters for defining documentary layer labels in the toolbar have been added to `bae.ini`. This feature can be used for, e.g., substituting the numeric documentary layer labels in vertically oriented toolbars with more descriptive documentary layer names.

The All Visibles button for assigning the color selected through the color bar at the bottom of the color table to all currently visible layers has been added. This feature is useful for generating dumbed down color tables with emphasized highlighthing and net coloring.

Color tables saved with layout elements were not always restored when automatically loading the last processed element upon **Layout Editor** startup, This problem has been fixed.

Layer Browser

The Documentary Side 1 and Documentary Side 2 options for restricing documentary layer displays to documentary layer solder or part sides has been added to the View / Other Functions / Layer Browse dialog.

Only the first seven documentary layers were faded-out when the layer browser was activated. This problem has been fixed.

Library Macro DRC

The `DEFLIBDRC_GED` parameter for setting a default for the Utilities / DRC Error List / Library Element DRC mode to be used when creating a new layout has been added to `bae.ini`.

Macro Outline Display

The `Macro Outline Display` parameter for activating a dashed macro outline display for parts on layout level and padstacks on part level has been added to the `View` / `Settings` dialog. The macro otulines are displayed in the workarea color. The default `During Placement` setting displayes macro outlines during macro placement operations for the positioned macro only. The `Always` activates the macro outline display for all layout elements. The `Never` deactivates the macro outline display. The macro outline display allows for part outlines to be checked for workarea fit during placement operations and helps to evaluate autoplacement results. With `Always`, it is recommended to select different colors for the workarea and DRC errors to prevent macro outlines from being confused with DRC error markers.

Pad Layer Usage Check

The `File` / `Library Utilities` / `Check Drill Padstacks` function has been modified to include multi-layer padstacks without drill holes.

4.3   Parts, Placement

Part Pick

The part pick functions have been modified to allow for part picks at part level traces. This simplifies the interactive connections to pre-routed part level fanout trace structures with the p key.

The part origin pick function has been modified to be only available for unmirrored parts if the top layer and/or the insertion plan part side (side 2) is visible, and for mirrored parts if the signal layer 1 and/or insertion layer solder side (side 1) is visible. This prevents the user from accidentally picking invisible part origin points on the invisible opposite side of the intended pick element. The insertion plan document layer is designated through the `SILKSCREEN_LAY bae.ini` parameter which is evaluated by the File / Library Utilities / Macro Generator function. The visibility of the part origin marker changes with the corresponding layer visibility settings if the pick point display is activated.

Part List

Part side information notes for constructive parts have been added to the part list which is displayed through the Part List All function of the 1 key layout report function, thus allowing for the distinction of constructive parts and net list parts.

Part Placement Angle Lock

The functions for moving parts have been extended by a middle mouse button function for an orthogonal direction angle lock to be applied to support part movement operation along the existing X or Y coordinate of the part.

Part DRC

The Part Edit DRC option for activating a continuous online DRC for keepout areas on documentary layers during part movement operations has been added to the Settings / Settings dialog. Keepout area pairs causing distance violations are highlighted with different error color patterns. This allows for the recognition of part and/or keepout area collisions before finishing part placement operations, even if the corresponding DRC layers are faded out in the current color table.

The Parts / Other Functions / Update Macros function for replacing incorrect part layout macros has been modified to display the list of incorrect part package type assignments which allows for part package type assignments to be excluded from the subsequent package type replacement operation.

The DRC error marker display for net list parts placed with incorrect package types has been changed from a dotted line matching the element outline to a dotted line exceeding the element outline by 10 percent to improve the error marker visibility for parts where the part insertion plan outline matches the part macro element outline.

The Parts / Other Functions / Update Macros function for replacing incorrect part layout macros has been modified to display the list of incorrect part package type assignments which allows for part package type assignments to be excluded from the subsequent package type replacement operation.

Alternate Part Macros

The p key part property dialog function for assigning a net list part name to a constructive non-netlist part has been modified to keep the existing part macro instead of switching to the net list part default macro if the existing part macro is in the alternative package type list of the net list part. This simplifies the process of updating part names after duplicating similar circuitry as it eliminates the need for specific package assignments.

Part Renumbering

The Part Side Suffix and Solder Side Suffix options for specifying part placement side name suffices have been added to the parameter dialog of the Parts / Other Functions / Autoname Parts / All Prefixes function. Regardless of any placement side suffix settings, the part numbering algorithm still creates unique numbers for each name prefix to avoid the creation of part names such as, e.g., `R100T` and `R100B` in a part renumbering process.

Part Renaming

The Parts / Other Functions / Autoname Parts submenu functions have been modified to preserve the group selection status of renamed symbols.

The Names from .ass function for restoring netlist part names according to the backannotation entries of the project **.ass** file has been added to the Parts / Other Functions / Autoname Parts submenu.

The No [ ] Block Parts option has been added to the Rename Macro Type and All Prefixes part rename functions. The No [ ] Block Parts option allows for parts from hierarchical blocks with corresponding part name prefices to be excluded from part rename batches in order to preserve references to hierarchical block symbol names which were not affected by backannotation operations.

The p key property dialog for parts with **$rpname** attribute assignments has been modified to reset and deactivate the Netlist Part Name control such net list name changes for parts with **$rpname** attribute assignments would be reversed by the next **Packager** run.

Pin Numbering

The function for saving part macro symbols has been modified to issue a warning if the symbol contains pin names with numeric parts at the end and pins are not consecutively numbered.

Load Macro (BAE HighEnd)

The Load Macro New Window for loading the macro in a new **Schematic Editor** window has been added to the context menus for part, vias, pins and pads. The Load Macro New Window is useful when controlling symbol macros in large layouts as it eliminates potentially time-consuming layout reload operations. Please note that, if the loaded macro is modified, the elements referring the macro must be reloaded to reflect the macro changes.

4.4 Traces, Routing

Move Corners

The Move Corner menu item in the Traces menu has been renamed to Move Corner(s).

The Move Corner context function for moving trace corners has been modified to automatically insert additional 45 degree segments at both neighbouring segments if the Octagonal option is active.

Moving and/or inserting corner points in segments with neighbouring vias on both sides sometimes caused a discrepancy between displayed layers/vias and the real via position. This problem has been fixed.

Trace Scan

The trace edit scan function for identifying the elements of connected traces recognized pin connections only if the connecting pad layer was visible. This could cause different behaviour for different color table settings, e.g., when fixing traces, connecting different traces from different directions to the same pin, etc. This behaviour has been changed. Pin connections are now reliably recognized independently of any color table settings.

Point to Point Traces

The Point to Point Trace has been modified to allow for the generation of fixed traces through the Settings dialog which is available through the start point context menu.

Pin Connection

The Use Pad Dimension and Connect with Pad Dimension modes have been added to the trace width context menu which is available through the s (Size) key during trace corner point manipulations to set the trace width to the selected pin pad. Connect With Pad Dimension generates a connection to the pin position according to the p key shortcut. The **SPINPICK_GED** parameter for automatical;ly using the current mouse position for the pin pick when pressing the s key has been added to the **bae.ini** file.

Airlines

The airline calculation has been modified to consider trace corners of traces placed on part level with corner mincon options.

Trace Conflicts

The **TRCCOLLDST_GED** parameter for configuring the automatic conflict trace recognition in such a way that only short circuits are considered to be conflicts and pure clearance errors are accepted without verification has been added to **bae.ini**.

Trace Arcs

Trace arc segments with a radius smaller than half the trace width could cause display and CAM output problems due to overlapping segment end caps. This problem has been fixed.

The function for placing circle center points with active edit display has been modified to display four quarter circle segments at the current trace width rather than a dimensionless circle line. This enables active DRC display modes to highlight possible trace arc DRC errors straight-away when setting the circle center point rather than having to set the circle end point as well to see any DRC errors.

Corner Manipulation

The Corner mode option for controlling the behaviour of the Arcs Single and 45 Degree Angles Single functions has been added to the C corner processing dialog. The Single Corners mode processes each selected trace corner with the same radius and/or the same angulation. The Differential Pair mode prompts for the selection of two 90 degree corners, and the radius/angulation of the second corner is automatically adapted under the assumption that differential pairs are being processed and the trace arc and diagonal segment clearances must match those of the neighbouring parallel segments. The Bus mode allows for corner radius/angulation settings for multiple bus traces through the selection of the first, second and last bus corner. The trace corner pick sequence (inside to outside or outside to inside) determines whether the radius/angulation increases or decreases with each trace corner step.

Trace Segment Insertion

The Insert Segment has been modified to use the trace segment selection pick point as first insertion point for the new segment and to carry out the selection of the second insertion point and the segment distance in one go. this reduces the number of mouse clicks required for inserting a trace segment from 4 to 2.

Redundant Trace Points Optimization

The functions for automatically joining same direction diagonal trace segments have been significantly improved. This increases the number of diagonal trace segments which can be automatically joined when being moved towards each other.

Trace Segment Movement

The Adjust next neighbours only option has been added to the right mouse button context menu of the Move Segment segment function. Unlike Adjust neighbours, Adjust next neighbours only refrains from skipping over neighbouring segments within trace width distance. This simplifies the manipulation of wide traces with frequent direction changes in densely routed areas.

The Move Segment function has been modified to re-calculate and display the complete routing rather than only neighbouring trace segments during segment move operations. The continously updated total length of the processed trace in the status line includes rerouted neighbouring segments.

The Move Segment Bundle function for moving bundles of parallel traces in a single step has been added. After selecting the first segment, the system scans at the gridless mouse cursor position for further segments on the same layer and with the same direction to be included in the segment move operation. The Bundle Selection parameter with the First+Last Segment and Continuous modes has been added to the Settings / Settings dialog. First+Last Segment prompts for the selection of the first and last trace bundle segment. Continuous prompts for the selection of the firts trace bundle segment and searches for further segments on the same layer and in the same direction at the grid-free mouse position. With Edit Display set to filled traces and pick mode set to Continuous, moved traces will be displayed in hatch fill mode to distinguish traces which have been selected for the move operation from those which have not yet been selected.

The with Split mode for automatically splitting trace segments at obstacles has been added to the Segment Move parameter of the Settings / Settings dialog. When encountering a DRC conflict, the with Split mode searches for a long grid-based remaining segment for carrying out the segment move operation at the mouse position and leaves partial segments in conflict areas at their original position. Please note that the trace segments are adapted according to the sequence of the bundle selection if the with Split mode is used together with Move Segment Bundle. The segment in line with the segment move direction should therefore be selected first to ensure that a segment bundle is routed around an obstacle.

Trace Length Adjustment

The Traces / Other Functions / Trace Length / Serpentine Trim Length has been modified to consider same net elements as obstacles when generating meandering structures. This prevents the system from generating meandering structures over a pin if segments of the same net are running alongside that pin.

The Trace End Pick and Trace Segment Pick processing modes have been added to the meander parameter dialog. Trace End Pick starts meandering at the trace end point closest to the pick point. Trace Segment Pick starts meandering at any pick segment end point of the trace, thus allowing for meandering to be carried out in free board ares rather than in part fanout areas.

The Serpentine Trim Length and Pair Trim Length functions from the Traces / Other Functions / Trace Length submenu have been modified to store the end coordinates of the processed segments with the trace. The Traces / Other Functions / Trace Length / Remove Serpentines function has been added to straighten the traces which have been marked in such a way.

Trace Length Report

The Compressed Table option for generating a net length semicolon-separated net length table without space characters with field content information (trace counts, via counts, etc.) documented in a single table header line has been added to the dialogs of the All Nets by Name, All Nets by Length, Visible Nets by Name and Visible Nets by Length trace length report functions from the Traces / Other Functions / Trace Length / Length Query submenu. Output files created with the Dump function using the Compressed Table format can be easily imported into third party spreadsheet applications for further processing.

The net length report headers have been extended to list not only maximum trace length violations (nets with a net trace length exceeding the maximum trace length set through the `$maxnetlen` net attribute), but also minimum trace lengths violations (nets with a trace length less than the minimum trace length set through the new `$minnetlen` net attribute).

Activating the p key property dialog for traces with net connections to many vias and traces can trigger a lengthy scan for calculating the total net length. This scan can now be cancelled through a keystroke. The `PROPNETSCAN_GED` parameter for specifying a maximum net pin count for automatic total net length calculations has been added to the `bae.ini` file. Please note that total net lengths can always be queried using the Info button of the p key dialog.

The online trace length display for manual routing operations displayed inaccurate values for arcs with non-orthogonal start radius. This problem has been fixed.

Differential Pairs

The Traces / Other Functions / Parallel Traces / Change Pair Spacing function for changing the spacing between parallel traces has been added. Only parallel segments with the lowest distance between the traces are processed.

With the Round corners option activated, the Traces / Other Functions / Parallel Traces / Wide to Differential Pair function rounded outside corners in relation to the original corner of the processed trace. This behaviour has been modified. The trace is now rounded in relation to the corner of the inner neighbouring trace to achieve a more accurate parallel trace clearance distance.

Bus Traces

The Traces / Add Pair/Bus function for simultaneously placing multiple parallel traces on a layer has been implemented. Add Pair/Bus prompts for the number of traces, the trace width, the clearance between traces, the trace corner rounding mode and the trace generation mode. With the default trace generation mode for not generating single traces, a combined parallel trace bundle is generated around the placement center line polygon. Basic functions for manipulation trace corners and segments are applied to all parallel traces of such a combined parallel trace bundle.

When editing parallel traces, the Change Width context function does not only allow for changing the trace width but also the clearance and corner rounding mode of the processed parallel trace bundle.

When routing normal traces, the corner points of the traces inside a parallel trace bundle can be picked with the p key to allow for easy pin connections to pair/bus ends.

Parallel trace bundles are stored as hatching area sub-types. Unreleased BAE 7.8 versions prior to BAE Version 7.8.052 expect closed hatch areas and issue a `File structure damaged!` error when loading a parallel trace bundle with a start/end point connection cutting the trace segments.

The Traces / Other Functions / Wide to Differential Pair has been renamed to Wide to Pair/Bus and generates trace pairs or busses which can subsequently be processed in the same way as the traces created with the Traces / Add Pair/Bus function.

DXF Export

The function for exporting mirrored DXF data exported trace arcs with wrong arc directions. This problem has been fixed.

Autorouter Options

The system has been modified to save Autorouter options not only when starting an Autorouter run but also when saving the layout. This allows for the permanent definition of layout-specific Autorouter parameters for future Autorouter runs without having to start the Autorouter.

Coordinate Snap

The extended x key coordinate snap functions have been made available in the functions for moving inner trace corner points.

The Move Trace and Copy Trace functions have been modified to set the placement reference point to the closest trace corner point rather than the closest end point. Thus, the trace does not "jump" anymore if an inside point is picked, and trace placements with trace inside point pick can be performed.

Trace Area Generation

The Traces / Other Functions / Trace to Area submenu functions have been modified to detect whether contour segments of the generated areas intersect each other and produce the outer contour without any invalid inner segments in such cases. This allows for otherwise unjoinable recesses to be joined as, e.g., intended when generating trace clearance keepout areas.

The trace area generator created invalid trace end caps rotated by 90 degrees when applied to traces with arc segments at the start or end point. This problem has been fixed.

Via Definitions

Before activating the dialog for manually selecting a standard via, the functions for creating and editing traces are now trying to use the default via macro setting DEFVIA_GED from bae.ini if no standard via macro is selected in the current project.

Via Placement

The Dot Fill Area and Create Trace Shield functions from the Traces / Via Functions have been modified to allow for the specification of a group name for the generated vias. This simplifies the removal of these vias if a redesign is necessary lateron.

The Create Trace Shield function has been modified to place vias at the outside of acute angle corners on an arc rather than on straight lines. This creates an improved via placement pattern and prevents the system from placing obsolete long parallel via rows at acute ("needle-shaped") trace corners. Segment parallel lines at the inside angles of short segments are now crossed and merged to prevent the system from creating invalid via row loops with clearance violations.

The Create Trace Shield function generated at least one via at arc segments. This caused erroneously placed vias at short arc segments. This problem has been fixed.

Via Macros

The pstk_minwidth and pstk_maxwidth plan double predicates for setting padstack-specific connection width ranges for vias have been added for padstacks. If multiple via padstacks are defined with identical layer assignments, the system automatically picks the via padstack which best matches the current trace width when switching layers during manual routing.

When editing traces, the automatic via selection function sometimes selected a wrong via macro for stacked blind/buried vias, thus potentially causing short-circuits. This problem has been fixed.

Net Visibilities

The Settings / Settings dialog has been modified to display the number of visible and/or invisible nets in the column headers for the net visibility function buttons to indicate the current extend of net visibility changes without having to run these functions.

4.5   Graphic, Copper Areas

Move Corners

The Move Corner menu item in the Areas menu has been renamed to Move Corner(s).

The Move Corner context function for moving polygon corners has been modified to automatically insert additional 45 degree segments at both neighbouring segments if the Octagonal option is active.

The dashed line input grid display used for edit direction indication for adjacent segments during polygon corner modifications could cause display performance problems when working with very small input grid settings. To eliminate this problem, the system has been modified to switch to a standard 2.0mm dashed line display when the input grid is set below a certain minimum value.

Polygon Pick

The Move Area and Copy Area functions have been modified to allow for areas to be picked not only at corners but also at segments. This ensures that the Move Area and Copy Area functions in the right mouse button context menus for areas can process the context area even it has been picked at a segment rather than a corner point. The reference point for the move operations is still the area corner point closest to the pick point.

With the Warp to Element Pick Position option activated through Settings / Settings bae.ini, the graphic cursor jumps to the closest area corner point when selecting areas.

The Pick Center function which is available through the right mouse button context menu during polygon move operations has been modified to ignore end points of closed polygons. This allows for symmetric closed polygons to be placed relative to the symmetric center point.

Arc Radius

The arc radius control for arc center points in the p key property dialog has been modified to allow for changing the arc radius rather than only displaying it. Arc start and end points are automatically re-positioned according to modified radius settings.

The Arcs Single functions from the submenus for processing trace and polygon corner points which can also be activated through the c key have been modified to remove an existing arc and create a new arc with specified radius when clicking the center point of an existing arc. Unlike the p functions, the c functions move the arc center point in such a way that the position and direction of neighbouring segments is preserved.

Arrow Drawing

The Line and Polyline functions for adding an arrow tip to the end of graphic line segments and line polygons have been added to the Areas / Other Functions / Drawing Utilities / Draw Arrows submenu.

DXF Import

The AutoCAD/DXF Input function only partially imported filled areas with arcs in the outline. This problem has been fixed.

The Polygon Mode parameter for controlling whether circles and/or ellipsis should be imported as lines or areas has been renamed to Circles/Ellipses, and the Closed Lines mode for importing closed line polygons as areas has been added.

4.6   Text, Drill

Text Alignment

The Align right option has been added to the text placement functions.

The BAE/ASCII Input function ignored text center alignment and text frame settings when importing `.dmp` files. This problem has been fixed.

Text Design Rule Check

The design rule check has been modified to check signal layer texts with pen width settings using the text line geometry rather than the surrounding rectangle when carrying out text clearance checks against other signal layer elements. This allows for signal layer texts with lower case characters to be placed closer to pins and/or other structures without triggering redundant clearance check error messages.

Attribute Display

Attribute name texts have been modified to support the `$U` prefix for displaying the attribute text in upper case and the `$l` prefix for displaying the attribute text in lower case. I.e., the `$U$llname` attribute text definition causes the lower case `$llname` (logical library name) attribute from the **Packager** to be displayed in upper case.

Text Alignments

The Change Text String and Text(s) Layer Copy batch options of the File / Library Utilities / Layout Library Edit Batch function have been modified to transfer the source text center alignment definitions to the target texts.

4.7   Group Functions

Default Settings

The `GRPDISPMODE_GED`, `GRPANGMODE_GED` and `GRPVISMODE_GED` `bae.ini` settings for initialyzing Edit / Group Settings parameters upon **Layout Editor** startup were not processed. This problem has been fixed.

Airline Display

The Airline Display default option for displaying airlines from group-selected net list pins to the rest of the layout during interactive function group placement operations has been added to Edit / Group Settings.

Named Group Movement

The Move Group xxx function has been added to the right mouse button context menu for named groups. Move Group xxx resets the current group, selects all elements with a group name assignment equal to the group name of the selected element, performs a Move Group operation and resets the group selection again. This simplifies the movement of named function blocks as it eliminates the need for explicitly selecting the function block elements prior to the move operation.

Drills

The Edit / Other Functions / Load without Hierarchy submenu functions on padstack level have been modified to place drill holes from source elements and/or source element references directly on the currently loaded padstack element.

Documentary Layer Pads

The functions from the Edit / Other Functions / Load without Hierarchy submenu did not load pad areas onto documentary layers if these pad level areas are defined as copper areas and if the pad is only assigned on padstack level to a documentary layer. This problem has been fixed.

Glued Elements

The Move Group function has been modified to provide options for deselecting or moving glued group elements or cancel the function if glued elements are in the group.

Net Selection

The net name selection box of the Edit / Other Functions / Select / Net function has been modified to accept net name patterns for the selection of net elements.

Group Selection Reports

Some of the selection and deselection functions from the Edit / Other Functions submenu reported incorrect (double) selected element counts when called through the menu bar rather than the F9 key. This problem has been fixed.

Load without Hierachy

The Edit / Other Functions / Load without Hierarchy function failed to load vias without via macro in the project or selected library file if the `VIAHIERL_GED` parameter for activating via placement was set in `bae.ini`. This problem has been fixed.

4.8   Automatic Copper Fill

Fill Area Settings

The `Pick` button for copying copper fill parameters from a selectable fill area has been aded to the `p` key properties dialog and the `Set Polygon Type/Net` functions for setting fill area specific copper fill parameters.

Analogously, a `Transfer fill parameters` auxiliary function for transfering copper fill parameters from a copper fill area selected through `Areas` / `Other Functions` / `Fill Area List` to selectable other copper fill areas has also been implemented.

Fill Isolation Distance

The `fill_isoldist` double value predicate for assigning a non-default copper fill clearance different from the default copper fill clearance and DRC clearance parameters to specific elements such as traces, areas, vias, padstack macros and pad macros has been added. This predicate can be used to trace to copper fill area clearances for specific impedance requirements. Please note that the application of the `fill_isoldist` predicate may cause copper fill DRC errors as it overrides any other DRC settings and is applied without the default copper fill clearance setting.

Fill Area Keepouts

The `Inner Fill Area Keepout` copper fill option has been modified to overlap other fill areas of the same net within the selected fill area with half of the minimum structure size rather than keeping the specified isolation distance. This allows for the generation of connected copper areas for the same net with varying isolation distances.

The `Router Keepout` option for marking the fill areas as an **Autorouter** keepout areas has been added to the `p` key property dialog for fill areas. **BAE HighEnd** provides additional options for restricting the keepout to vias or traces.

Trace Cutout

The copper fill functions used the default net clearance settings instead of non-default net-sepcific clearance settings for traces on part level, thus producing DRC errors for traces on part level with increased net-specific clearance settings. This problem has been fixed.

Special trace width, pad radius and fill clearance parameter combinations caused diagonal trace clearance DRC errors when creating fill areas at diagonal pad connections. This problem has been fixed.

Pad Gap Keepout Coverage

The `Areas` / `Other Functions` / `Fill Area Gap Keepouts` function has been implemented for automatically creating copper fill keepout areas at narrow gaps between round pins and vias, thus preventing the copper fill functions from creating copper fill structures which might cause problems in the manufacturing process.

5   Autorouter

5.1   General

Routing Wave Display

During autorouting, the routing wave display can be toggled with the ⊞ key. The Ctrl-C keystroke has been added for stopping the autorouting wave display after each routing step and activating a key prompt for continuing the routing. Pressing the space bar starts the next routing step. Pressing any other key resumes the autorouting and routing wave display without interruption after each routing step. Being able to look at the routing wave propagation after each routing step can help to understand why the routing of a connection can not be completed.

6 CAM Processor

6.1 General

Settings (Windows)

Tab controls and a number of parameter settings which were previously only implemented through different menus and submenus have been added to the Settings / Settings dialog of the BAE **Windows** versions.

Combined Layer Outputs

The multilayer selection dialog has been modified to display the controls for selecting signal and documentray layer side-by-side if the BAE window is wide enough, thus eliminating the need to switch between signal and documentary layer selection dialogs.

6.2 Control Plot

Bitmap Output

A Clipping option for restricting bitmaps outputs to a layout clipping area has been added to the Monochrome Bitmap Output.

The Monochrome Bitmap Output batch step of the CAM-Batch Output function has been modified to optionally allow for the clipping area to be selected through the specification of two parts names. This allows for the output to be automatically restricted to the area between two fiducial parts with predefined names.

6.3 Gerber Photo Plot

Inner Layer Pads (BAE HighEnd)

The integer predicate `pad_allplot` for inside layer pads on padstack level has been added to enable the output of unconnected pads regardless of any All Layers Mode setting. This feature is required for manufacturing processes where partial drill holes must be terminated with pads.

6.4 Drilling Data Output

Tool Tables

The default parameter Output only used Tools for listing only those drill holes/diameters which are actually being used on the layout has been added to the Drilling+Insertion / Settings and File / Export functions. Without this parameter, the drill hole diameter definitions from the standard via are listed in the tool table even if these drill diameters are not used on the layout.

The `DRLTOOLOPT_LAY` setting from `bae.ini` is used for CAM batches from older BAE versions without support for the Output only used Tools parameter.

6.5 Insertion Data Output

Insertion Data Output

The `Generic Insertion Output` function has been modified to support the `PINNET` output field for exporting the net name of a pin. This is useful for insertion data outputs from insertion layers which only contain insertion texts for test point macros with fixed pin names, thus generating test point coordinate outputs with test net listings.

The `QATTRIBUTE` command has been modified to support a new optional parameter for comparing output text attributes.

The `OUTPINPICK` command for exporting all pin coordinates instead of all part coordinates has been implemented. The `PINNAME` and `PINATTRIBUTE` output fields for accessing pin data have been added. `OUTPINPICK` outputs ignore the pin name specified through `PINNET` and always output the net of the current pin instead. This allows for the generation of arbitrary line-oriented pin/net data output formats.

The `FILTER` parameter for optionally restricting `OUTPICK` and `OUTPINPICK` outputs to parts with reference names matching the specified name filter has been added.

The `PREFIX` parameter for specifiying an output file name prefix has been added.

7   CAM View

7.1   General

Settings (Windows)

Tab controls and a number of parameter settings which were previously only implemented through different menus and submenus have been added to the Settings / Settings dialog of the BAE **Windows** versions.

7.2   Data Import

Aperture Tables

Rectangular apertures were not correctly converted when importing aperture tables from extended Gerber files if the aperture definitions contained spaces between the dimension values. This problem has been fixed.

Scaling

The Scale Coordinates, Scale Aperture Table and Scale Tool Table functions for scaling the cordinates of loaded data sets and/or aperture dimensions by a specific factor have been added to the Edit menu. These functions carry out corrections which may be necessary after importing data from third party systems with different lenth unit control command conventions. The controls for specifying the scaling factors are supporting numeric operations to allow for inputs such as `1.0/2.54`.

8   Utilities

8.1   COPYDDB

Error Messages

The **COPYDDB** utility program has been modified to include file names with file-related error messages to simplify error tracking when running batches with multiple **COPYDDB** calls.

9 Bartels User Language

9.1 General

This section describes general changes to the **User Language** specification. See Bartels User Language Programmer's Guide - Chapter 2 for a detailed description of the **User Language** specification.

Internal User Language Version

The internal **User Language** version has been changed. **User Language** programs compiled under BAE versions prior to BAE V8.0 won't execute in the **User Language Interpreter** environment of the new **Bartels AutoEngineer** version (error message `User Language program version incompatible!`) and must be recompiled under the new **BAE** version to regain compatibility.

User Language programs compiled under **BAE V8.0** and later can execute in the **User Language Interpreter** environment of the new **Bartels AutoEngineer** version without being re-compiled. However, it is recommended to re-compile these programs as well to ensure that the latest **User Language** features are enabled.

9.2 System Functions

This section lists new and changed **User Language** system functions. See Bartels User Language Programmer's Guide - Appendix C for a detailed description of all system functions.

New System Functions

The following **User Language** system functions have been implemented:

IP	System Function	Short Description
CAP	**cap_getscclass**	Get currently scanned SCM element class
AR	**ar_getstrpar**	Get Autorouter string parameter
AR	**ar_setstrpar**	Set Autorouter string parameter

Changed System Functions

Support for additional parameter queries/settings has been added to the **bae_getdblpar**, **bae_setdblpar**, **bae_getintpar**, **bae_setintpar**, **bae_getstrpar**, **bae_setstrpar**, **scm_getintpar**, **scm_setintpar**, **scm_getstrpar**, **scm_setstrpar**, **ged_getintpar**, **ged_setintpar**, **ged_getdblpar**, **ged_setdblpar**, **ged_getstrpar**, **ged_setstrpar**, **ar_getintpar**, **ar_setintpar**, **cam_getintpar** and **cam_setintpar** functions.

The **bae_dialaddcontrol** / **bae_dialadvcontrol** functions have been modified to support the definition of tooltip strings for action/toggle/radio buttons and references to external bitmap files for display in bitmap labels and buttons. In the BAE **Windows** versions, the **bae_dialaddcontrol** / **bae_dialadvcontrol** functions have been extended to support tab controls.

The **strlistitemadd** function did not add the item to the list string. This problem has been fixed.

A new net selection mode has been added to the **ged_asktreeidx** function.

The **ged_drcpath**, **ged_drcpoly** and **ged_drcvia** functions have been extended by a path connectivity checking mode for displaying violations against any tree beside the pick element.

The **ged_getsegmovmode** and **ged_setsegmovmode** functions have been extended to support the trace segment move mode "Adjust next neighbours only".

9.3 BAE User Language Programs

BAE installs more than 220 pre-compiled **User Language** programs to the `ulcprog.vdb` file of the BAE programs directory. Additionally, the **User Language** *source* files (more than 10 Mbytes; some 350,000 lines) are installed to a special directory (`baeulc`). See Bartels User Language Programmer's Guide - Chapter 4 for a complete listing and short descriptions of the BAE **User Language** programs.

User Language Include Files

The **User Language** include files have been revised and extended by a series of new definitions and functions.

The following **User Language** include files have been implemented:

IP	Include File	Short Description
STD	**XML.ULH**	XML File Utilities

New User Language Programs

The following **User Language** programs have been implemented:

IP	Program Name	Short Description
SCM	**SSVGOUT**	Schematic SVG (Scalable Vector Graphics) Output
LAY	**LSVGOUT**	Layout SVG (Scalable Vector Graphics) Output

Changed User Language Programs

The **User Language** programs already delivered with the previous BAE Version have been revised and extended by many new features and functions.